

20041208.ba v03_n736.bam.20041208

>From ???@??? Wed Dec 8 01:43:08 2004 -0600
Date: Wed, 8 Dec 2004 01:39:39 CST
From: Old Tube Radios <boatanchors@theporch.com>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: BOATANCHORS digest 3736
Message-Id: <20041208073940.41898215AF9@srvr1.theporch.com>

BOATANCHORS Digest 3736

Topics covered in this issue include:

- 1) More on the Carbon Resistor Issue.
by David Stinson <arc5@ix.netcom.com>
- 2) Re: EF Johnson VFO Mod Instructions?
by wb3fau@att.net
- 3) Re: EF Johnson VFO Mod Instructions?
by "john" <johnmb@nc.rr.com>
- 4) Re: More on the Carbon Resistor Issue.
by "Tom Rauch" <w8ji@contesting.com>
- 5) Re: EF Johnson VFO Mod Instructions?
by Joe LeKostaj <jm_lekostaj@attglobal.net>
- 6) Ranger Resistor Riot
by "Richard Humphrey" <n6nae@ix.netcom.com>
- 7) Re: EF Johnson VFO Mod Instructions?
by "Arden Allen" <gumbear@pacbell.net>
- 8) Carbon resistor fun
by John Shriver <jshriver@internap.com>
- 9) Re: More on the Carbon Resistor Issue.
by "Arden Allen" <gumbear@pacbell.net>
- 10) Missing Screws
by "b. smith" <smithab11@comcast.net>
- 11) RE: Missing Screws
by "Grant Youngman" <nq5t@comcast.net>
- 12) Re: Missing Screws
by Mike Hanz <AAF-Radio-1@cox.net>
- 13) Re: Missing Screws
by WA5CAB@cs.com
- 14) Re: Missing Screws
by ail0@att.net
- 15) Resistor Redux
by "Dr. Barry L. Ornitz" <ornitz@tricon.net>
- 16) Re: Resistor Redux
by Dan Arney <hankarn@pacbell.net>
- 17) Re: Missing Screws
by "Ed Zeranski" <ezeran@ezeran.cnc.net>
- 18) Re: Missing Screws

by William Donzelli <aw288@osfn.org>
19) Resistor in Parasitic Suppressor
by "Tom Rauch" <w8ji@contesting.com>
20) Re: EF Johnson VFO Mod Instructions?
by Henry van Cleef <vancleef@eskimo.com>
21) RE: Resistor Redux
by Morris Odell <morriso@vifm.org>

Message-ID: <41B5BD2B.1020901@ix.netcom.com>
Date: Tue, 07 Dec 2004 08:24:43 -0600
From: David Stinson <arc5@ix.netcom.com>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
Subject: More on the Carbon Resistor Issue.
Content-Type: text/plain; charset=us-ascii; format=flowed
Content-Transfer-Encoding: 7bit

I was thinking of the long-term implications
of carbon resistor aging:
Suppose I have a stock of old, unused carbon resistors.
They have, on average, aged 5-10% high in value- some even more.
Assuming that I use the "aged" value,
can they do reliable service in some circuits,
or will the age-induced errors increase and/or
accelerate once they are installed?

From: wb3fau@att.net
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: EF Johnson VFO Mod Instructions?
Date: Tue, 07 Dec 2004 14:27:36 +0000
Message-Id:
<120720041427.6238.41B5BDD7000EE0310000185E21602806519A0E00CC0D99@att.net>

Johnson used cheap components, they are well documented for
lite transformers. Given a choice of cheaper resistors, they would
have taken that path. But I am not here to slam Johnson, competition
in business is fierce. Holding down costs etc. Remember, this stuff
was never intended to operate 55 years later, who would have ever
thought we would be doing this? We stopped throwing the stuff away and
resurrecting it. Russ.

From: "john" <johnmb@nc.rr.com>
To: Old Tube Radios <boatanchors@theporch.com>
Date: Tue, 07 Dec 2004 09:46:48 -0500

Subject: Re: EF Johnson VFO Mod Instructions?
Message-ID: <41B57C08.11736.8D6DB0@localhost>
Content-description: Mail message body
Mime-Version: 1.0
Content-Transfer-Encoding: 7bit
Content-Type: text/plain; charset=US-ASCII

I disagree. Johnson used some of the better components available of the day... theirs, for a start. Ballbearing variable caps, ceramic tube sockets, reduction drives instead of string and pulley, etc). They also used quality nickel plated hardware, and electrical components from leading suppliers (Allen Bradley, CD, etc).

There were 50's suppliers that used cheap parts (hellooo Hallicrafters!) but EFJ not typical of them.

John

On 7 Dec 2004 at 14:27, wb3fau@att.net wrote:

> Johnson used cheap components,

--

No virus found in this outgoing message.

Checked by AVG Anti-Virus.

Version: 7.0.289 / Virus Database: 265.4.6 - Release Date: 12/5/2004

Message-ID: <009101c4dc7b\$287a2c40\$6601a8c0@akorn.net>
From: "Tom Rauch" <w8ji@contesting.com>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: More on the Carbon Resistor Issue.
Date: Tue, 7 Dec 2004 11:38:18 -0500
MIME-Version: 1.0
Content-Type: text/plain;
 charset="iso-8859-1"
Content-Transfer-Encoding: 7bit

> I was thinking of the long-term implications
> of carbon resistor aging:
> Suppose I have a stock of old, unused carbon resistors.
> They have, on average, aged 5-10% high in value- some even
more.
> Assuming that I use the "aged" value,
> can they do reliable service in some circuits,
> or will the age-induced errors increase and/or
> accelerate once they are installed?

Most of my resistor life experience is in manufacturing and failure analysis of newer products (under ten years old). I don't know how resistors that are starting to fail from humidity or connection problems would recover, but I'd never trust them myself.

73 Tom

Mime-Version: 1.0
Message-Id: <p05010405bddb9086de3e@[192.168.1.4]>
Date: Tue, 7 Dec 2004 11:05:46 -0600
To: Old Tube Radios <boatanchors@theporch.com>
From: Joe LeKostaj <jm_lekostaj@attglobal.net>
Subject: Re: EF Johnson VFO Mod Instructions?
Content-Type: text/plain; charset="us-ascii" ; format="flowed"

My two cents re: carbon comp resistors:
In the ham gear that I've repaired over the last 5 years, there have been far many more carbon comps that increased in resistance than decreased. But yes, I've encountered a few that had decreased.

73,
Joe K9LY

Message-ID: <4120041227174838300@ix.netcom.com>
From: "Richard Humphrey" <n6nae@ix.netcom.com>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Ranger Resistor Riot
Date: Tue, 7 Dec 2004 9:48:38 -0800
MIME-Version: 1.0
Content-Type: multipart/alternative;
boundary="-----_NextPart_84815C5ABAF209EF376268C8"

-----_NextPart_84815C5ABAF209EF376268C8
Content-type: text/plain; charset=US-ASCII

All this talk about carbon(ised) resistors led me to pull my Ranger off the storage shelf and remove the vfo cover. It still has the original 18K 2Watt resistor. It looks in fine condition and measures 20.81K ohms. To quote the philosopher Homer, "DOH!". I'll replace it anyway. I've been meaning to fire it up someday, it just never got to the front of the queue. Got it at an estate sale in San Francisco from the SKs daughter. He was a retired MM sparks. He built it from the

kit. It has no audio tubes in it and never did.

Richard

-----=_NextPart_84815C5ABAF209EF376268C8
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

* * * * *
* ---REMAINDER OF MESSAGE TRUNCATED--- *
* This post contains a forbidden message format *
* (such as an attached file, a v-card, HTML formatting) *
* Mail Lists at theporch.com only accept PLAIN TEXT *
* If your postings display this message your mail program *
* is not set to send PLAIN TEXT ONLY and needs adjusting *
* * * * *

-----=_NextPart_84815C5ABAF209EF376268C8--

Message-ID: <003301c4dc88\$c8bd5210\$1de47443@KB6NAX>
From: "Arden Allen" <gumbear@pacbell.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: EF Johnson VFO Mod Instructions?
Date: Tue, 7 Dec 2004 10:15:43 -0800
MIME-Version: 1.0
Content-Type: text/plain;
charset="iso-8859-1"
Content-Transfer-Encoding: 7bit

Well, Brian and Tom, let's play nice and keep in mind there are two issues in play for the folks who read along.

Carbon resistors, for the most part, drift higher in value with age. Even while sitting in thier original packaging. I've got drawers full of those and ohming each resistor is required before use. Allen Bradley resistors seem to have the least drift with age

Having a mere 50 years of experience dabbling in electronics I have occasionally come across the drastically decreased value phenomenom. In every case it is where a resistor has operated in a circuit within its rating although at a relatively high percentage of its maximum specified capability. One must also keep in mind the ambient temperature the resistors are operating in and perhaps device body temperature is a factor to consider. No one to my knowledge knows the exact mechanism but it does happen albeit infrequently compared to the usual aging problem we are all familiar with.

Also, keep in mind what I said previously, if a resistor's value decreases such that its dissipation increases there is eventually a turnaround point in circuits that supply approximately constant current in which the resistor's value drops to the point where dissipation starts to decrease and hence the value stabilizes at its new lower value. In circuits that supply more constant voltage the resistor goes on to burn up, overheating is such that its value increases to the point where dissipation starts decreasing or its value remains low enough that the resistor heats to the point of becoming a flare and burning itself out. All you see is the end result, not how it got there.

I have encountered all types of failures in carbon comp resistors having repaired some 3000+ pieces of equipment over that span of years (yes, my records support that count).

A footnote: Carbon comp resistors should have been discarded long ago as they became a dirty word to all who wanted to produce quality products. The "me too" resistor manufacturers produced real garbage carbon comps. But never underestimate the lack of quality consciousness of the American consumer goods producer. Fisher Radio learned to import quality parts from Germany in the 50's as one quality standout.

Arden Allen
KB6NAX

Message-ID: <41B5F96F.2000309@internap.com>
Date: Tue, 07 Dec 2004 13:41:51 -0500
From: John Shriver <jshriver@internap.com>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Carbon resistor fun
Content-Type: text/plain; charset=ISO-8859-1; format=flowed
Content-Transfer-Encoding: 7bit

To have some fun with carbon resistor runaway, plug a 390 ohm 2 watt carbon composition resistor into a 120VAC wall socket (or maybe an extension cord, outside). Stand back and watch.

Some college friends of mine considered this good fun.

Personally, I liked 100 ohms 1/2 watt, across a beefy low voltage Lambda supply, say at 20V. On clip leads, slid under door of computer room. Nice slow stinking roast (magic smoke on tap).

Message-ID: <006f01c4dc8c\$12f8bd80\$1de47443@KB6NAX>
From: "Arden Allen" <gumbear@pacbell.net>

To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: More on the Carbon Resistor Issue.
Date: Tue, 7 Dec 2004 10:39:14 -0800
MIME-Version: 1.0
Content-Type: text/plain;
charset="iso-8859-1"
Content-Transfer-Encoding: 7bit

> I was thinking of the long-term implications
> of carbon resistor aging:
> Suppose I have a stock of old, unused carbon resistors.
> They have, on average, aged 5-10% high in value- some even more.
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> can they do reliable service in some circuits,
> or will the age-induced errors increase and/or
> accelerate once they are installed?

Good question, Dave. It's safe to assume that resistors will drift somewhat after placed in operation. The question is to what effect? As you know some resistor values have very little effect on circuit operation, grid return resistors in circuits where there is no grid current, for example. If the value is somewhere in the "ballpark" you will never know if its value has drifted 10, 20 or even 50%. In the case of two resistors in series forming a voltage divider, if they both drift the same amount in the same direction you will not likely discover their value shift. If in an audio amplifier the cathode and plate resistors drift the same percentage the gain will not change if the cathode resistor is unbypassed. And on and on it goes.

The places I replace resistors with metal film and metal oxide resistors are in circuits where I don't want problems to occur because of value drift and low level circuits where I don't want carbon resistor noise to be a problem. Carbon film resistors are usually a big improvement over the comps they replace also. Someone once said, "if it won't work with 20% parts it ain't electronics." I'd be inclined to call that electrical gadgetry, however.

Arden Allen
KB6NAX

Message-ID: <001b01c4dcab\$dd8e10d0\$94f02144@Denroom>
From: "b. smith" <smithab11@comcast.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Missing Screws
Date: Tue, 7 Dec 2004 17:26:55 -0500
MIME-Version: 1.0
Content-Type: text/plain;
format=flowed;

charset="iso-8859-1";
reply-type=original
Content-Transfer-Encoding: 7bit

Perhaps someone on the list can explain to me. Why is it that when you take a cover off of a radio and remove twenty-four small screws and carefully put them on the side of the bench . . . Why is it that when you put the cover on the next day that one screw is always missing.

breck k4che

Dover, Delaware
Annt nutten in Dover except
Chickens, a NASCAR track,
and hams that can't solder.

From: "Grant Youngman" <nq5t@comcast.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: RE: Missing Screws
Date: Tue, 7 Dec 2004 16:44:35 -0600
MIME-Version: 1.0
Content-Type: text/plain;
charset="us-ascii"
Content-Transfer-Encoding: 7bit
Message-Id: <20041207224444.D38AB215AF2@srvr1.theporch.com>

> Perhaps someone on the list can explain to me. Why is it
> that when
> you take a cover off of a radio and remove twenty-four small
> screws and carefully put them on the side of the bench . . .
> Why is it that when you put the cover on the next day that
> one screw is always missing.

Maybe something kinky going on between those and the missing socks? :-)

Grant/NQ5T

Message-ID: <41B631FF.3060708@cox.net>
Date: Tue, 07 Dec 2004 17:43:11 -0500
From: Mike Hanz <AAF-Radio-1@cox.net>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
CC: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: Missing Screws
Content-Type: text/plain; charset=ISO-8859-1; format=flowed
Content-Transfer-Encoding: 7bit

Finagle's Theory of Random Events impacting a Corollary of Murphy's Law.

b. smith wrote:

```
> Perhaps someone on the list can explain to me. Why is it that
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> it that when you put the cover on the next day that one screw is
> always missing.
>
> breck k4che
>
> Dover, Delaware
> Annt nutten in Dover except
> Chickens, a NASCAR track,
> and hams that can't solder.
>
```

From: WA5CAB@cs.com
Message-ID: <13c.7ffbb57.2ee78d42@cs.com>
Date: Tue, 7 Dec 2004 17:48:34 EST
Subject: Re: Missing Screws
To: Old Tube Radios <boatanchors@theporch.com>
MIME-Version: 1.0
Content-Type: multipart/alternative;
boundary="part1_13c.7ffbb57.2ee78d42_boundary"

--part1_13c.7ffbb57.2ee78d42_boundary
Content-Type: text/plain; charset="US-ASCII"
Content-Transfer-Encoding: 7bit

Naah. They supply the dark matter from which coathangers grow.

In a message dated 12/7/2004 4:46:32 PM Central Standard Time,
nq5t@comcast.net writes:

```
> >Perhaps someone on the list can explain to me. Why is it
> > that when
> >you take a cover off of a radio and remove twenty-four small
> >screws and carefully put them on the side of the bench . . .
> >Why is it that when you put the cover on the next day that
> >one screw is always missing.
>
> Maybe something kinky going on between those and the missing socks? :-)
```

Robert Downs - Houston
<<http://www.wa5cab.com>> (Web Store)
<wa5cab@cs.com> (Primary email)
<wa5cab@houston.rr.com> (Backup email)

--part1_13c.7ffbb57.2ee78d42_boundary
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

```
* * * * *
*      ---REMAINDER OF MESSAGE TRUNCATED---      *
*      This post contains a forbidden message format      *
*      (such as an attached file, a v-card, HTML formatting) *
*      Mail Lists at theporch.com only accept PLAIN TEXT      *
*      If your postings display this message your mail program *
*      is not set to send PLAIN TEXT ONLY and needs adjusting *
* * * * *
```

--part1_13c.7ffbb57.2ee78d42_boundary--

From: ail0@att.net
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: Missing Screws
Date: Tue, 07 Dec 2004 23:18:11 +0000
Message-Id: <120720042318.9879.41B63A320008C508000026972160281060CF04070E@att.net>

----- Original message -----
From: "b. smith" <smithab11@comcast.net>
> Perhaps someone on the list can explain to me. Why is it that when
> you take a cover off of a radio and remove twenty-four small screws and
> carefully put them on the side of the bench . . . Why is it that when you
> put the cover on the next day that one screw is always missing.
>
> breck k4che
>
Come to my house and I'll give you a pair of screws - - -
I had to replace the humidistat in a dehumidifier recently. All the screws
went into a pill box. When I got done, I had 2 white paint-topped screws left
over. These obviously came from the housing since the interior screws were
un-painted. You would think that there would be two obvious holes on the
outside
without white heads showing - but nope!
Anyway, the humidifier works fine. I had another one to do (I bought 4 at the
same
time to keep my shore home arid) and two humidistats died in the first two
years.
No screws left over the second time. I must have learned something from my

first

experience.

Anyway, I now have 2 white-headed screws waiting for a hole to show up.
Art K3HBA

Message-ID: <004e01c4dcbc\$f4f473c0\$e55f62d8@barry1>

From: "Dr. Barry L. Ornitz" <ornitz@tricon.net>

To: Old Tube Radios <boatanchors@theporch.com>

Subject: Resistor Redux

Date: Tue, 7 Dec 2004 19:29:17 -0500

MIME-Version: 1.0

Content-Type: text/plain;

charset="iso-8859-1"

Content-Transfer-Encoding: 7bit

Dave wrote:

> Ya'll are actually debating two separate issues.

Actually there at least four issues.

Carbon composition resistors are made of graphite particles mixed with clay, as Arden noted, and are compressed into shape. End caps and leads are added and the overall unit is encapsulated. What happens to the resistance over time depends on how the resistor is used and what environment the resistor is in.

High value resistors tend to have lots of clay to make the resistivity of the mixture higher. Moisture ingress causes the clay to swell such that the graphite particles do not make as good a contact with each other, and the resistance goes up. Baking the resistor to remove the moisture can bring the resistance down closer to its original value, but not entirely so.

Low value resistors have little or no clay so moisture ingress does not cause the same problems with high value resistors. High temperatures, however, can cause the graphite particles to bond to each other lowering the resistance as Tom noted. Carbon does have a negative temperature coefficient of resistance, but that is not the issue at hand. It is seldom a problem, but moisture in a low value resistor can actually cause a tiny decrease in resistance when the moisture is absorbed between the graphite planar layers. The slight swelling can cause the particles to touch each other with more force, lowering the resistance. But this effect is quite small

and the moisture usually bakes out the first time the resistor is used.

Loss of contact between the end caps and the compressed carbon element usually results in higher resistance. This is seldom a problem with quality resistors, but corrosion and thermal cycling can be a problem in older gear occasionally. This effect is more prevalent in low value resistors where the contact resistance is a greater percentage of the total value. If you have resistors where the wire leads are just wrapped around the resistor ends, throw them away. [But some early metal film resistors were made this way too. Instead of a carbon rod, these have ceramic rods with the metal film deposited on the outside.]

The final point that no one has brought up yet is that of the resistor encapsulation. While one or two manufacturers experimented with a silicone dip of the resistor internals before encapsulating with phenol resin, most manufacturers went straight to the encapsulation step. A resistor operated at elevated temperatures can cause the phenol to degrade (and even char in severe cases). When the silicone is overheated, it oxidizes but remains an insulator. Phenol resins, however, depolymerize and produce a conductive material. The awful smell of overheated phenol resin is the phenol being released. Any resistor overheated enough to have this easily recognized smell should be discarded to avoid future problems. This issue is why high valued resistors can apparently short under overloads.

With the cost of modern carbon and metal film, and metal oxide resistors being so low, and with the exceptional stability of metal film and metal oxide units, trying to find carbon composition resistors is a waste of time and money.

And before someone asks about the inductance of metal film resistors, I refer them to several papers on this in the Boatanchor Library I wrote several years ago (*). For resistors 1 Kohm and above, the capacitance between the leads dominates. For resistors 10 ohms and less, the inductance does have an effect, but only at frequencies well into the VHF region. There is a graph in the Library that illustrates this too.

The voltage rating of a resistor has been beaten to death here in the past, but people continue to ignore this issue. In the last issue of QST for example, an article mentions using five several megohm resistors in series to produce a 5 KV meter multiplier. This is 1 KV per resistor and is about four times

what these resistors are rated at. I strongly suggest staying well within the voltage ratings AND the power ratings.

73, Barry WA4VZQ ornitz@tricon.net

(*) Files: Film_Resistor_Impedance.gif ; resist.gif , and resistors.101.txt in the Boatanchor Library at www.theporch.com.

A somewhat more updated version of this discussion, including how the metal film resistor was modeled can be found on the SMECC.ORG site at:

http://www.smecc.org/haz-mat_in_military_comm_.htm

Message-ID: <41B65938.5020804@pacbell.net>
Date: Tue, 07 Dec 2004 17:30:32 -0800
From: Dan Arney <hankarn@pacbell.net>
MIME-Version: 1.0
To: Old Tube Radios <boatanchors@theporch.com>
CC: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: Resistor Redux
Content-Type: text/plain; charset=ISO-8859-1; format=flowed
Content-Transfer-Encoding: 7bit

Dr. Barry, it is so good that came in from the lurking sidelines to attempt to impart your great knowledge on the subject all of the so called experts. Some had the right track..
Your explanation should put this to rest.

Nice to see you are still watching over us.
Have good Holiday Season.
Hank
KN6DI

Message-ID: <013d01c4d165\$5b996c60\$41513180@spawar.navy.mil>
From: "Ed Zeranski" <ezeran@ezeran.cnc.net>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: Missing Screws
Date: Tue, 23 Nov 2004 06:04:30 -0800
MIME-Version: 1.0
Content-Type: text/plain;
charset="iso-8859-1"
Content-Transfer-Encoding: 7bit

> > Perhaps someone on the list can explain to me. Why is it
> > that when
> > you take a cover off of a radio and remove twenty-four small
> > screws and carefully put them on the side of the bench . . .
> > Why is it that when you put the cover on the next day that
> > one screw is always missing.

You're actually suppose to throw one behind the bench for the screw
gods.....if you don't they take one anyway.

EdZ

Date: Tue, 7 Dec 2004 21:21:57 -0500 (EST)
From: William Donzelli <aw288@osfn.org>
To: Old Tube Radios <boatanchors@theporch.com>
cc: Old Tube Radios <boatanchors@theporch.com>
Subject: Re: Missing Screws
Message-ID: <Pine.SUN.4.20.0412072121100.16662-1000000@osfn.org>
MIME-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

> You're actually suppose to throw one behind the bench for the screw
> gods.....if you don't they take one anyway.

Around here, they are bench trolls. Pay the toll in extra screws, and they
will let your repair go smoothly.

William Donzelli
aw288@osfn.org

Message-ID: <004c01c4dcd3\$560cb4e0\$6601a8c0@akorn.net>
From: "Tom Rauch" <w8ji@contesting.com>
To: Old Tube Radios <boatanchors@theporch.com>
Subject: Resistor in Parasitic Suppressor
Date: Tue, 7 Dec 2004 22:09:30 -0500
MIME-Version: 1.0
Content-Type: text/plain;
charset="iso-8859-1"
Content-Transfer-Encoding: 7bit

Thanks for the excellent explanation Barry.

> And before someone asks about the inductance of metal film
> resistors, I refer them to several papers on this in the

> Boatanchor Library I wrote several years ago (*). For resistors
> 1 Kohm and above, the capacitance between the leads dominates.
> For resistors 10 ohms and less, the inductance does have an
> effect, but only at frequencies well into the VHF region.

Since they do their job mainly well up into VHF, the inductance of spiral cut metal or carbon resistors can ruin what used to be a working suppressor with resistors are in the 33-100 ohm range. We do have to be careful replacing old carbon comps with *larger* size newer resistors. Some resistors that look like carbon comps actually are not.

http://www.w8ji.com/Carbon_Metal_resistors.jpg

Comps were so hard to get (only from A-B the last I knew) I took to using compensating caps in series with 2-3 W metal oxide resistors and it actually greatly improves the suppressor. ~80pF typically nulls reactance at 100 MHz or so in the resistors we used. The series capacitor reduces heating caused by HF RF, and "tips in" the suppressor resistor at a faster rate as frequency is increased. This is especially helpful at reducing suppressor dissipation when used with tubes that like to oscillate low in VHF, like those big glass bottles with long internal grid leads.

Of course now there are OX and OY series Ohmite metal compositions, and they work dandy as replacements (and can be off the shelf stock) for those VHF applications that require very low inductance. You also won't have the decreasing resistance problem when used at high temperatures common in suppressors made with carbon comps.

73 Tom

From: Henry van Cleef <vancleef@eskimo.com>
Message-Id: <200412080611.WAA25150@eskimo.com>
Subject: Re: EF Johnson VFO Mod Instructions?
To: Old Tube Radios <boatanchors@theporch.com>
Date: Tue, 7 Dec 2004 23:11:13 -0700 (MST)
Cc: boatanchors@theporch.com (Old Tube Radios)
MIME-Version: 1.0
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit

The esteemed Bob Roehrig has said:

>

> On Mon, 6 Dec 2004, Arden Allen wrote:

>

> > I had already by then repaired stuff with carbon resistors that had

> > drastically decreased in value.

>

> I have replaced many carbons that dropped drastically in value, mostly in

> higher powered circuits.

>

>

Last two "failed low" carbon resistors I remember were in the cathode circuit of the output stage, one in an RME-45 (single 7C5) and the other in a Hallicrafters S-36A (push-pull 6V6).

I'm a little surprised at all this discussion. I've always regarded "low" as a common carbon composition resistor fault, and the cathode bias resistor in an output stage always gets a check for proper value.

On the other hand, I think of another common fault. Customer complains about lack of RF sensitivity, and I find drifted-high resistors in the IF and RF cathodes.

Hank

--

Hank van Cleef (vancleef@eskimo.com, hvanclee@nyx.net)
1986 420SEL "A stranger in paradise" (Fremont Co. Wyoming)
1986 GMC 1500 6.2 diesel pickup "Seen one, seen them all"

Date: Wed, 08 Dec 2004 18:39:02 +1100

From: Morris Odell <morriso@vifm.org>

Subject: RE: Resistor Redux

To: Old Tube Radios <boatanchors@theporch.com>

Message-id: <D02380C06383C847B2282343465930BE058690@my.vifp.monash.edu.au>

MIME-version: 1.0

Content-type: multipart/mixed; boundary="Boundary_(ID_nfpu6875yxrDGnXqD3CSKQ)"

content-class: urn:content-classes:message

This is a multi-part message in MIME format...

--Boundary_(ID_nfpu6875yxrDGnXqD3CSKQ)

Content-type: text/plain; charset=us-ascii

Content-transfer-encoding: 7BIT

Content-disposition: inline

content-class: urn:content-classes:message

Hi Barry and the gang,

Great comments, cutting right through the haze as usual.

> And before someone asks about the inductance of metal film
> resistors, I refer them to several papers on this in the
> Boatanchor Library I wrote several years ago (*). For resistors
> 1 Kohm and above, the capacitance between the leads dominates.
> For resistors 10 ohms and less, the inductance does have an
> effect, but only at frequencies well into the VHF region.
> There is a graph in the Library that illustrates this too.

This is certainly not a problem at HF boatanchor frequencies. I have tested a number of modern metal film resistors up to 100 MHz on a Boonton admittance bridge and they don't show any reactance worth worrying about.

Morris

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End of BOATANCHORS Digest 3736
